

A NEW SPECIES OF CIRRATE OCTOPOD
OPISTHOTEUTHIS VOSSI FROM THE
SOUTHEAST ATLANTIC (CEPHALOPODA: OCTOPODA)

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ABSTRACT

A new species of cirrate octopod, *Opisthoteuthis vossi*, is described from nine specimens taken at a depth of 900 m during a fisheries survey on the Valdivia Bank, some 600 kilometers west of the Namibian coast in the southeastern Atlantic.

Nine specimens of a cirrate octopod were captured during the "Valdivia" exploratory oceanographic trawl survey cruise (May and June 1981) conducted by the Spanish research ship CHICA TOUZA in the southeastern Atlantic on the Valdivia Bank, approximately 600 kilometers west of the coast of Namibia. Upon examination, the specimens were found to represent a new species of the genus *Opisthoteuthis* Verrill, 1883, the second species of the genus described or recorded from the Atlantic Ocean.

The measurements and indices used are those defined by Voss (1963, 1982) and Roper and Voss (1983). The holotype and one paratype are deposited in the United States National Museum of Natural History (USNMNH). The other paratypes are deposited in the Instituto de Ciencias del Mar de Barcelona (ICMB), and the Instituto de Investigaciones Marinas de Vigo (IIMV).

The following indices were used: Mantle width index (MWI): greatest width of mantle measured between the bases of the fins as a percentage of dorsal mantle length. Head width index (HWI): greatest width of head measured across eyes as a percentage of dorsal mantle length. Fin length index (FLI): length of fins measured from the midpoint of the base of the fin to the fin tip as a percentage of the head width. Fin width index (FWI): greatest fin width as a percentage of fin length. Mantle arm index (MAI): mantle length as a percentage of the length of the longest arm. Web depth index (WDI): depth of the deepest sector of the web as a percentage of the length of the longest arm. Sucker diameter index (SI): diameter of largest sucker as a percentage of mantle length. Cirrus length index (CILI): length of the longest cirrus as a percentage of mantle length.

Opisthoteuthis vossi new species

Figures 1 and 2

Material Examined.—All specimens from CHICA TOUZA Sta. 10, 22°29'S, 06°07'E, in 900 m with otter trawl, 21 May 1981.

Holotype.—A male, ML 55 mm, USNM 816660. *Paratypes.*—Three females, ML 49, 50, 66 mm and three males, ML 43, 68, 70 mm, all ICMB; one female, ML 52 mm, IIMV; one female, ML 61 mm, USNM 816661.

Description.—The body is somewhat depressed; when viewed laterally, it resembles a flattened, convex lens. Viewed ventrally, it looks somewhat jellyfish-like with an interbrachial membrane (web) encompassing two-thirds of the length of the arms. The mantle is short, depressed and globose, rounded posteriorly, slightly longer than it is wide. The pallial aperture is small, closely surrounding the funnel. The funnel is relatively long, conical, and narrow and is free for most of its length. The two small fins are laterally positioned, one on each side near the posterior of the mantle. The fins are short, about one-third of the head width or less, thick, fleshy basally and transparent. The posterior edge of the fins is nearly straight,

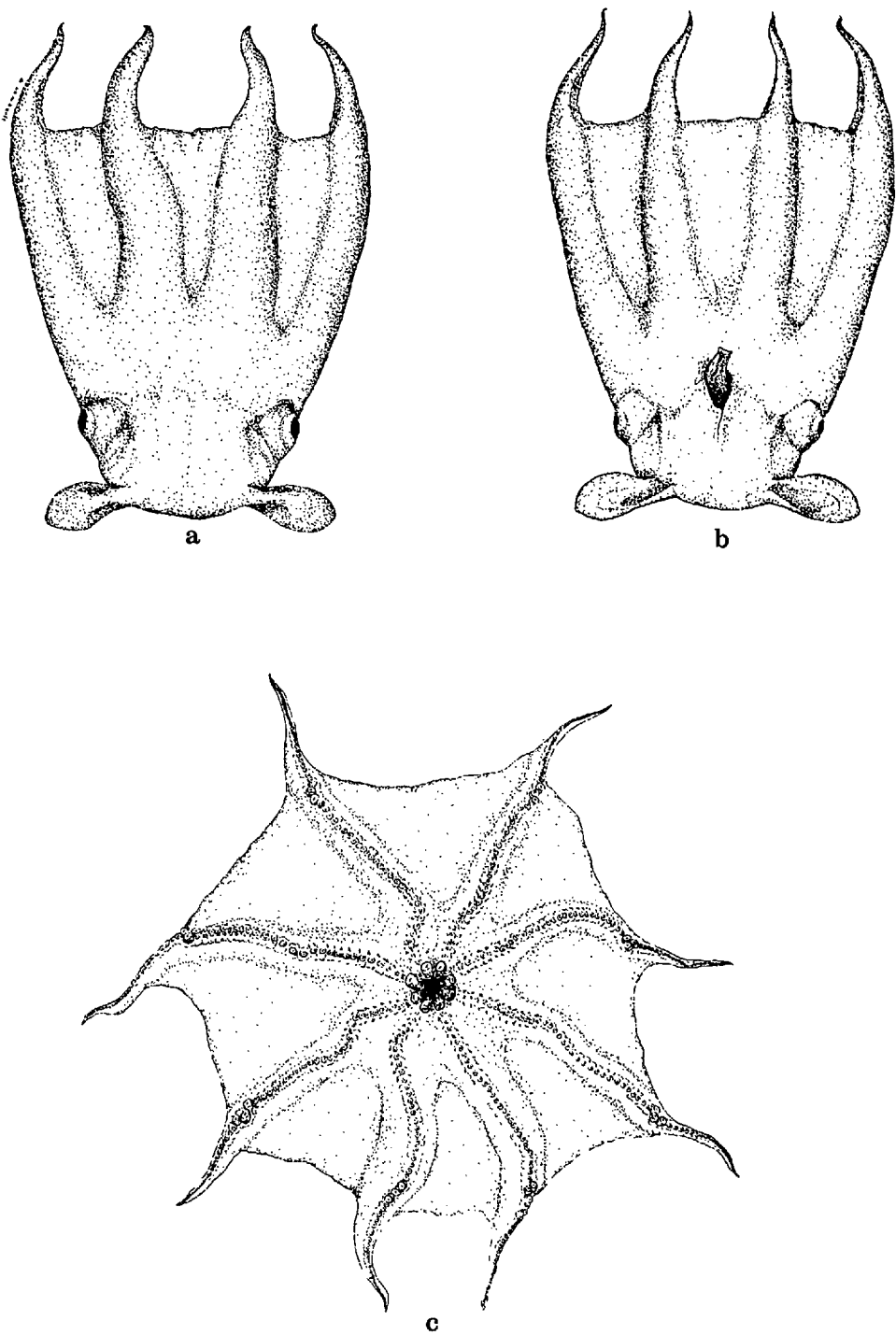


Figure 1. *Opisthoteuthis vossi*, new species. a. Dorsal view of holotype, mantle length 55 mm; b. Ventral view of same; c. Oral view.

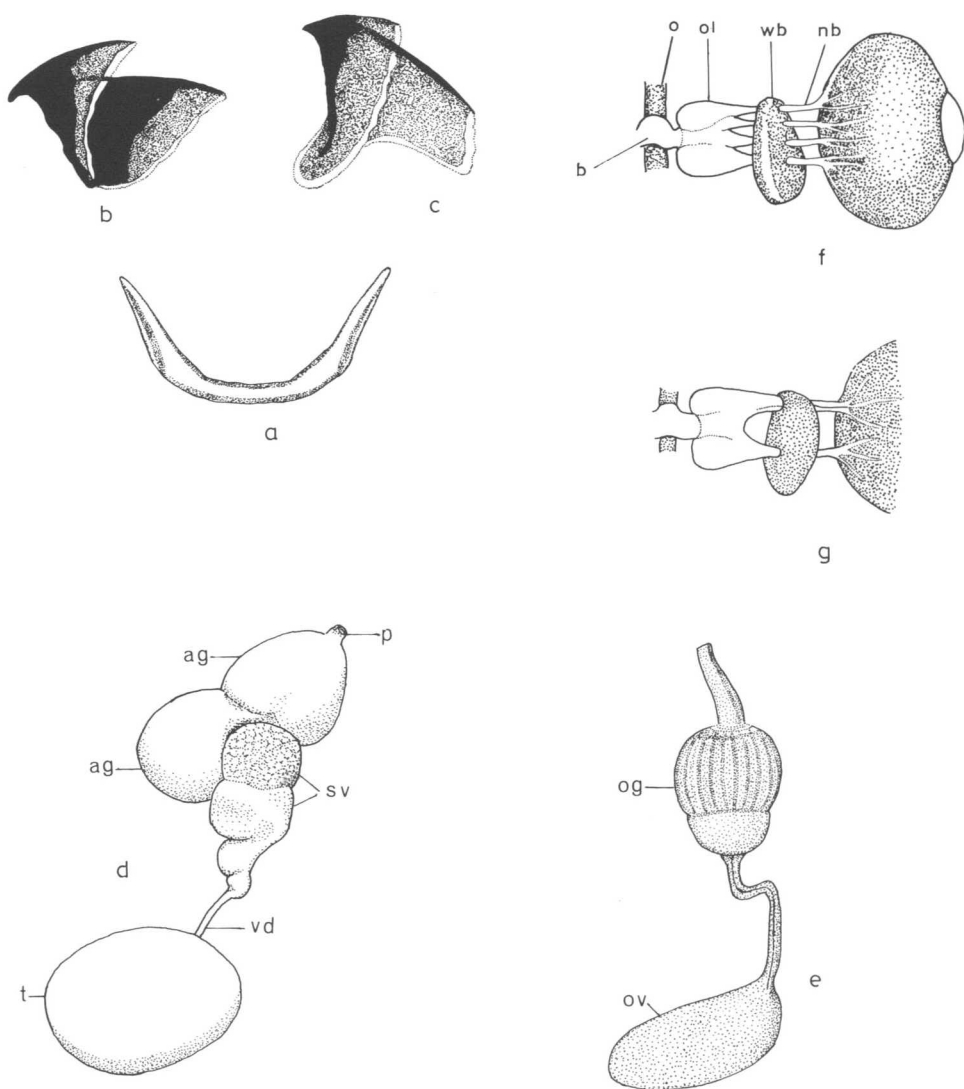


Figure 2. *Opisthoteuthis vossi*, new species. a. Shell vestige of male; b. Upper mandible; c. Lower mandible; d. Mature male genitalia; e. Immature female genitalia; f. Dorsal view of male eye complex; g. Dorsal view of female eye complex. (ag—accessory gland; b—brain; nb—nerve bundle; o—oesophagus; og—oviducal gland; ol—optic lobe; ov—ovary; p—penis; sv—seminal vesicle; vd—vas deferens; wb—white body.

the anterior border curved. The fins are almost twice as long as wide. The fin musculature forms a central bundle that tapers toward the fin tip. The head is wider than the mantle, with no constriction between the two. The eyes are large, somewhat protruding and ovoid. The eye opening is very small in the preserved specimens (Fig. 1).

The arms are moderately long, thick and fleshy. In the males, the dorsal arms (arms I) are very thick, muscular and robust proximally out to the level of the web margin, after which they become slender, attenuate. In the females, arms I

Table 1. Measurements (in mm) and indices of bodily proportions of 4 males of *Opisthoteuthis vossi*, n. sp.

	Holotype		Paratypes	
	(USNM)	(ICMB)	(ICMB)	(ICMB)
Mantle length	55	70	43	68
Ventral mantle length	51	53	39	62
Mantle width	105	79	40	83
Head with	105	81.5	77	100
Arm length I	270	266	135	220
II	280	240	155	230
III	280	245	155	230
IV	270	250	160	225
Fin length	42	36	25	47
Number suckers on arm I	88	93	89	93
Sucker diameter, enlarged	3.3	4.1	2	4.1
Cirrus length	4.3	4.8	3.5	4.2
Funnel length	42.4	37.1	33	33
Web depth, sector A	190	156	94	180
B	185	141	98	160
C	185	137	97	150
D	160	106	89	130
E	130	—	95	110
Number of gill lamellae	6	6	6	6
Mantle width index	191	112.8	93	122
Head width index	191	116.4	179	147
Fin length index	40	44.2	32.4	47
Mantle arm index	19.6	26.3	26.8	29.5
Cirrus length index	7.8	6.8	8.1	6.1
Sucker index	6.0	5.8	4.6	6.0
Web depth index	67.8	58.6	61.2	78.2

are not enlarged and are coequal with the others in appearance. The arm formula is variable; in the holotype it is $II = III.I = IV$, but in general the arms are subequal. The web is deep, occupying approximately 75% of the length of the arms and is relatively thick and strong. The web formula is difficult to determine because of its variability, but the formula for the holotype is $A.B = C.D.E$.

The suckers are in a single row and are deeply set into the arms. Arms I have between 39 to 48 suckers from the mouth to the margin of the web and about 40 from the web to the tips of the arms. The first four proximal suckers are small, the next three larger, after which they decrease progressively in size in the females. In the males, the increase in size of the buccal suckers is more marked, especially on arms II, III, and IV. In addition, in the males, there is a slight secondary enlargement of the suckers near the margin of the web in arms I. The enlargement is a little more noticeable on arms II and III and pronounced on arms IV where about 7 or 8 suckers are enlarged. The enlarged suckers in the male represent a form of hectocotylization.

The suckers are bordered on each side by a row of small, slender cirri. In the females, the length of the longest cirrus is nearly twice the diameter of the largest suckers. In the males, they are about as long the diameter of the largest enlarged suckers.

The shell vestige is broadly U-shaped, tapering toward the ends (Fig. 2a).

The gills are small, nearly spherical, with three large lamellae on the outer demibranch and three smaller ones on the inner demibranch, constituting six in all, arranged like the sections of an orange.

Table 2. Measurements (in mm) and indices of bodily proportions of 5 females of *Opisthoteuthis vossi*, n. sp.

	Paratypes				
	(USNM)	(ICMB)	(IIPV)	(ICMB)	(ICMB)
Mantle length	61	66	52	49	50
Ventral mantle length	42	53	36	47	47
Mantle width	41	54	52	40	42
Head with	78	81	70	72	83
Arm length I	—	210	174	150	195
II	170	210	170	145	200
III	170	220	172	150	200
IV	170	—	170	150	—
Fin length	28	38	26	26	42
Number suckers on arm I	85	87	79	87	90
Sucker diameter	2.9	2.9	2.3	2.4	2.4
Cirrus length	4.9	4.5	4.1	3.2	4.5
Funnel length	24.5	35.1	18.6	33	37.5
Web depth, sector A	96	137	95	118	160
B	91	135	103	97	130
C	98	150	99	97	130
D	91.5	145	86	92	125
E	91	130	75	90	115
Number of gill lamellae	6	6	6	6	6
Mantle width index	67.2	81.8	100	81.6	84
Head width index	127.8	122.7	134.6	146.9	166
Fin length index	35.9	46.9	37.1	36.1	50.6
Mantle arm index	24.1	30	29.8	32.6	25
Cirrus length index	8.0	6.8	7.9	6.5	9.0
Sucker index	4.7	4.4	4.4	4.8	4.8
Web depth index	57.6	68.1	59.1	78.6	80

The buccal mass is relatively large. The beaks are illustrated (Fig. 2b, c). There is no radula.

The genitalia of one male and one female were dissected. The testis is relatively small. The two accessory glands are round and approximately the same size (Fig. 2d). The ovary of one female contained 25 ovate eggs of varying sizes, the largest measuring 9.9 mm, bearing longitudinal striae alternating white and reddish in color; they were not mature. The female was nearly mature, and in view of the wide variation in egg size, the eggs are probably laid a few at a time over a considerable period. Only the left oviduct is functional. The oviducal gland is large, acorn-shaped and divided into two parts, the anterior large and dark, the posterior smaller and lighter (Fig. 2e).

The optic complex was dissected in both the male and the female to expose the eye, optic nerve, "white body" and optic gland (Fig. 2f, g). The optic gland is large, flattened and kidney-shaped, with four large, thick nerve bundles passing through the chocolate-colored "white body" in the male (Fig. 2f), but only two large nerve bundles in the female (Fig. 2g). They attach to the medial surface of the eyeball. The differences between the two are individual variation, not sexual (Voss, pers. comm.).

The body is smooth, and somewhat gelatinous, with a poorly developed musculature. The color of the preserved specimens is light reddish brown; the inside of the web is a dark chocolate brown with a slightly purplish hue on which the lighter-colored suckers and cirri are conspicuous.

The measurements and indices for all specimens are given in Tables 1 and 2.

Holotype.—A male, ML 55 mm, preserved in 50 percent isopropyl alcohol and deposited in the USNMNH, USNM 816660.

Type Locality.—22°29'S, 06°07'E, Valdivia Bank, approximately 600 kilometers west of the coast of Namibia (Southeast Atlantic), in 900 m.

Etymology.—We have given this species the name *vossi* in honor of Professor Gilbert L. Voss who has so greatly contributed to our knowledge of cephalopod systematics.

DISCUSSION

The specimens described here belong to the cirrate genus *Opisthoteuthis* which is characterized by a usually somewhat dorso-ventrally flattened body aspect, deep web involving nearly the entire arm length, small terminal or superior fins and, in the males, enlarged suckers usually located near the mouth and secondarily at about the level of the margin of the web. The cirri in both sexes are short, seldom exceeding twice the diameter of the normal suckers. The genus is further characterized by the large, flattened, kidney-shaped optic gland with few large nerve bundles passing through the "white body" to the eyeball (Voss, pers. comm.).

Berry (1918) confused the status of the genus by creating a subgenus *Opisthoteuthis* for species with a two-parted shell vestige and the subgenus *teuthodiscus* for those with a single, U-shaped shell vestige. The two-parted shell vestige was simply a U-shaped shell vestige that had broken into two parts as was clearly stated by Voss (1956), thus invalidating the subgenus. In the same paper, Berry (1918) stated that *Opisthoteuthis pluto* and *O. persephone* from Australian waters were found in two states, a flattened aspect thought typical of the genus, and an elongate, bell-shaped aspect resembling *Grimpoteuthis*. Thus the distinction between *Opisthoteuthis* and *Grimpoteuthis* is more subtle than was originally considered on shape alone.

At present there are nine described species in the genus: *Opisthoteuthis agassizi* Verrill, 1883; *depressa* Ijima and Ikeda, 1895; *medusoides* and *extensa* Thiele, 1915; *pluto* and *persephone* Berry, 1918; *californiana* Berry, 1949; *japonica* Taki, 1962 and *philippi* Oomen, 1976. The new species, *vossi*, can be distinguished from all of the above by the following combination of characters in the males: arms I extraordinarily strongly developed and robust and the number and distribution of the enlarged suckers near the mouth and again near the web margin on arms II and III, especially so on arms IV.

Separation of the females is difficult at the present knowledge of the genus and the lack of large series of specimens. More detailed study of the various species now placed in the genus is needed.

Of the nine species of *Opisthoteuthis* listed above, all are from the Indo-Pacific except *O. agassizi* which is widely distributed in the Atlantic Ocean. *O. vossi* can be distinguished from *O. agassizi* in the males by the very robust dorsal arms in *vossi* and the distribution of the enlarged suckers, six to seven large suckers basally in *agassizi*, to three in *vossi*. The other specific characters require further study, especially in the females.

The specimens from the Valdivia Bank were taken with bottom trawls, an indication that they dwell on or close to the bottom, in a benthic habitat. Their appearance suggests that they might float and move with their arms and web extended, as reported by Roper and Brundage (1972) from photographs of cirrate octopods taken at depths of approximately 1500 m and by Pereyra (1965) from observations of *O. californiana* in the aquarium.

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